J. WALTER LARSON
CURRICULUM VITAE
May 30, 2000

1. Personal Information

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Staff Position:
Assistant Computer Scientist
Appointed, December, 1999

Graduate Education:
College of William and Mary, Williamsburg, Virginia, U.S.A.
Ph.D. Physics, *Painlevé Singularity Analysis Applied to Charged Particle Dynamics During Reconnection*, May, 1992
M.Sc. Physics, May, 1986

Undergraduate Education:
Drake University, Des Moines, Iowa, U.S.A.
B.A. Physics and Mathematics, 1984

Citizenship: United States of America

Employment Background:
Assistant Computer Scientist, Mathematics and Computer Science Division, Argonne National Laboratory, December, 1999-present.
Research Associate, Department of Meteorology, Earth System Science Interdisciplinary Center (ESSIC), University of Maryland and NASA Data Assimilation Office (DAO), NASA Goddard Flight Center, October, 1996-December, 1999.
Consultant (Retained by R. J. Oglesby), Department of Earth and Atmospheric Sciences, Purdue University, June-October, 1996.
Postdoctoral Fellow, Centre for Resource and Environmental Studies, The Australian National University, June, 1994 - May, 1996.
Postdoctoral Fellow, School of Earth Sciences, Macquarie University (supported by a contract with the Model Evaluation Consortium for Climate Assessment (MECCA)), October, 1992 - June, 1994.
Consultant in timeseries analysis (retained by Allied Signal), May-October, 1992.

Research and Teaching Assistantships, College of William and Mary, 1984–1992.

2. Research, Scholarly, and Creative Activities

2.a.iii Chapters in Books:

E. R. Tracy, J. W. Larson, A. R. Osborne, and L. Bergamasco, "On the Nonlinear Schrödinger Theory as an Averaging Theory," in *Proceedings of the Fourth International Conference on Nonlinear Evolution Equations and Dynamical Systems*, J.Léon, ed. (World Scientific, 1988) pp 593-602.

E. R. Tracy, J. W. Larson, A. R. Osborne, and L. Bergamasco, "On the Relationship Between the Spectral Theories for the Periodic Korteweg-de Vries and Nonlinear Schrödinger Equations," in *Proceedings of the 1988 Enrico Fermi School*, A. R. Osborne and L. Bergamasco, Eds. Elsevier, Amsterdam, 1989.

P. M. Lyster, J. W. Larson, J. Guo, W. Sawyer, A. da Silva, and I. Stajner: "Progress in the Parallel Implementation of the Physical-space Statistical Analysis System (PSAS)," in *Making it's Mark: Proc. Seventh ECMWF Workshop on the Use of Parallel Processors in Meteorology*, Eds. G-R. Hoffmann and N. Kreitz, 382-393 (World Scientific, 504pp, 1998).

2.b. Refereed Publications:

E. R. Tracy, J. W. Larson, A. R. Osborne, and L. Bergamasco, "On the Nonlinear Schrödinger Limit of the Korteweg-de Vries Equation," *Physica*, **32D**, 83 (1988).

J. W. Larson and E. R. Tracy, "Spectral Averaging of Small-Amplitude Sine-Gordon Wavetrains," *Physical Review* **38A**, 4419 (1988).

J. W. Larson, "Painlevé Singularity Analysis Applied to Charged Particle Dynamics During Reconnection", PhD Thesis, College of William and Mary, (1992).

J. W. Larson and E. R. Tracy, "Integrability Properties of Charged Particle Dynamics in Reconnection Regions," *Physics Letters* **182A**, 249 (1994).

S. Marshall, R .J. Oglesby, J. Larson, and B. Saltzman, "A Comparison of GCM Sensitivity to Changes in CO_2 and Solar Luminosity," *Geophysical Research Letters*, **21**, 2487-90 (1994).

J. Syktus, J. Chappell, R. Oglesby, J. Larson, S. Marshall, and B. Saltzman, "Signal-Noise Patterns from Two General Circulation Models with CO_2 Forcing: Implications for Recognition of Enhanced Greenhouse", *Climate Dynamics*, **13(5)**:293-302 (1997).

D. E. Hyman, D. R. Whitehouse, J. A. Taylor, J. W. Larson, and J. A. Lindesay, "The ANU Translator: Facilitating computer visualization and data analysis of climate model outputs," *Environmental Software*, **11**, 65-72 (1996).

S. Marshall, J. A. Taylor, S. D. Prager, R. J. Oglesby, J. W. Larson, and D. J. Erickson III, "Climatic effects of biomass burning," *Environmental Software*, **11**, 53-58 (1996).

P. M. Lyster, J. W. Larson, W. Sawyer, C. H. Q. Ding, J. Guo, A. M. da Silva, L. L. Takacs, "Parallel Computing at the NASA Data Assimilation Office (DAO)," *Proc. Supercomputing97*, San Jose, November (1997). Available at `http://www.supercomp.org/sc97/proceedings/TECH/LYSTER/INDEX.HTM`

C. H. Q. Ding, P. M. Lyster, J. W. Larson, J. Guo, A. da Silva, "Atmospheric Data Assimilation on Distributed-Memory Parallel Computers," in *International Conference and Exhibition on High-Performance Computing and Networking (HPCN Europe '98)*, Springer-Verlag, Lecture Notes in Computer Science, (1998)

W. Sawyer, R. Lucchesi, P. M. Lyster, L. L. Takacs, A. Molod, J. Larson, S. Nebuda, C. Pabon-Ortiz, "Parallelization of DAO Atmospheric General Circulation Model," in *Proceedings of the Fourth International Workshop on Applied Parallel Computing (PARA98)*, Springer-Verlag, Lecture Notes in Computer Science, (1998).

2.c. Monographs, Reports, and Extension Publications:

J. Larson and A. Henderson-Sellers, *Tropical Cyclones and Climate Change: Preliminary Study of Formation and Potential Impacts.* A report to the Model Evaluation Consortium for Climate Assessment (MECCA) (1994). Available on-line at `http://www.epri.com/ME2CA/Cyclones.html`

J. Larson and I. Mokhov, *An Intercomparison of Total Cloud Among Six MECCA Phase I Models.* A report to the Model Evaluation Consortium for Climate Assessment (MECCA) (1994). `http://www.epri.com/ME2CA/Clouds.html`

J. W. Larson, G. Michael, and P. Wielopolski, *NCAR Community Climate Model (CCM1) on the AP1000: Towards a Research Tool.* A report to Fujitsu, Ltd., Tokyo, Japan, September, 1994.

J. W. Larson, *Visualization Issues Related to the Atmospheric Modeling Project on the AP1000.* A report to Fujitsu Ltd., Tokyo, Japan, September, 1994.

J. A. Taylor, J. W. Larson, and R. J. Oglesby, *Simulating the urban heat island effect using the NCAR/PSU MM4/MM5 regional Climate Models.* A report to Fujitsu Ltd., Tokyo, Japan, September, 1994.

D. E. Hyman, D. R. Whitehouse, J. W. Larson, and J. A. Taylor, *A visualization package for the atmospheric modeling project on the AP1000.* A report to Fujitsu Ltd., Tokyo, Japan, March, 1995.

J. W. Larson, J. A. Taylor, D. Sitsky, and J. Michalakes, *Establishment of the Penn State/NCAR Mesoscale Model 5 on the AP1000.* A report to Fujitsu Ltd., Tokyo, Japan, March, 1995.

J. W. Larson, J. A. Taylor, D. Sitsky, and J. Michalakes, *Status of MPMM on the AP1000.* A report to Fujitsu Ltd., Tokyo, Japan, September, 1995.

P. M. Lyster, J. W. Larson, C. H. Q. Ding, J. Guo, W. Sawyer, A. M. da Silva, and I. Stajner, *Design of the Goddard Earth Observing System (GEOS) Parallel Physical-space Statistical Analysis System (PSAS)*, DAO Office Note No. 97-05, NASA Goddard Space Flight Center, Greenbelt, Maryland (1997). Available at `http://dao.gsfc.nasa.gov/subpages/office-notes.html`

J. Guo, J. W. Larson, P. M. Lyster, and G. Gaspari, *Documentation of the Physical-space Statistical Analysis System (PSAS): The Factored Operator Error Covariance Model Formulation*, DAO Office Note 98-04, Data Assimilation Office, Goddard Space Flight Center, Greenbelt, MD 20771 (1998, in preparation).

J. Larson, J. Guo, P. M. Lyster, and G. Gaspari, *Documentation of the Physical-space Statistical Analysis System (PSAS): The Software Implementation of the PSAS*, DAO Office Note 98-05, Data Assimilation Office, Goddard Space Flight Center, Greenbelt, MD 20771 (1998, in preparation).

2.e.i. Invited Talks:
J. W. Larson: NASA Computational Aerosciences (CAS) Workshop '98, NASA Ames Research Center, (August 25-27, 1998).

J. W. Larson: "Proposal for standard diagnostics and data interchange modules in PIRCS", PIRCS Review and Planning Workshop, 22-23 May 2000, Copenhagen, Denmark.

2.e.ii. Contributed Talks and Colloquia:
Averaging of Nonlinear Wavetrains. Poster, Sherwood Plasma Theory Conference, Gatlinburg, Tennessee, April 18–20, 1988.
A Simulation of Interactions Between a Wave Packet and Particles Trapped in a Magnetic Mirror Field. Poster, First General Meeting of the APS Topical Group in Computational Physics, Boston, Massachusetts, June 5–8, 1989.
"Particle Dynamics in the Neighborhood of a Magnetic Null," American Geophysical Union Spring Meeting, Baltimore, Maryland, May 28–31, 1991.
"Painlevé Analysis of Reconnection Fields," Thirty-third Annual Meeting of the American Physical Society, Division of Plasma Physics, Tampa, Florida, November 4–8, 1991.
"Painlevé Analysis Applied to Particle Dynamics in Magnetic and Electric Fields Associated with Reconnection," Accepted paper, Sherwood Plasma Theory Conference, Santa Fe, New Mexico, April 6–8, 1992.
"Integrability Properties of Particle Dynamics During Reconnection," Poster, Spring Meeting of the American Geophysical Union, Montréal, May 11–15, 1992.
"Phase-Space Methods Applied to Climate Model Output," Tripartite Meeting on Climate Model Validation and Regional Scenarios, Melbourne, Victoria, April 4-7, 1993.
"Analysis of GCM Output on the Annual, Seasonal, Monthly, and Daily Timescales," Intergovernmental Panel on Climate Change (IPCC) Meeting, Sydney, Australia, February 7-9, 1994.
"Tropical Cyclones and Climate Change," MECCA Technical Committee Meeting, Sydney, Australia, February 10-11, 1994.
"Total Cloud Amount as Represented by GCMs," MECCA Technical Committee Meeting, Sydney, Australia, February 10-11, 1994.
" Analysis and Packaging of GCM Output," Centre for Resource and Environmental Studies (CRES) Seminar, The Australian National University, May 12, 1994.
"Regional and Global Atmospheric Models on the AP1000," CAP Technical Group Seminar, The Australian National University, July 13, 1995.
J. Fedchak and W. Cummings, and J. W. Larson, "Physics and the Creative Process," Forum with presented to the Psychology of Creativity course at Columbia

College, Chicago, December 12, 1995.
"A few Remarks on Numerical Model Validation and Sensitivity Analysis," ANU Advanced Computation Seminar, The Australian National University, April 29, 1996.
"Software Implementation of the Physical-space Statistical Analysis System (PSAS)," PSAS Workshop, NASA Goddard Space Flight Center, October 26, 1998.
"The Physical-space Statistical Analysis System (PSAS)," Seminar, Mathematics and Computer Science Division, Argonne National Laboratory, July 30, 1999.
"The Physical-space Statistical Analysis System (PSAS)–A Parallel Framework for Atmospheric Data Analysis?," ALICE Brown Bag Seminar, Mathematics and Computer Science Division, Argonne National Laboratory, March 23, 2000.

2.e.iii. Unrefereed Proceedings:
G. Michael and J. W. Larson, "CCM1 on The AP1000," in *Proceedings of the Third Parallel Computing Workshop*, Kawasaki, Japan, 1994.
J. W. Larson, J. A. Taylor, and R. J. Oglesby, (1994) "Atmospheric modeling on the AP1000," in *Proceedings of the Third Parallel Computing Workshop*, Kawasaki, Japan, pp. P2-T-1,5.
A. J. Jakeman, R. J. Oglesby, D. P. Hansen, D. A. Post, S. Schreider, J. A. Taylor, J. W. Larson, and G. M. Hornberger, (1995) "Modeling land surface-atmosphere interactions and water resource impacts: Alternative approaches," in *Proceedings of Second International Study Conference on GEWEX in Asia and GAME, National Research Council of Thailand*, Bangkok, Thailand, March 6-10.
S. Marshall, J. A. Taylor, S. D. Prager, R. J. Oglesby, J. W. Larson, and D. J. Erickson III, "Climatic effects of biomass burning," in *Proceedings of Global Analysis, Interpretation, and Modeling: the First Conference*, IGBP, Garmisch-Partenkirchen, Germany, 25-29 September, 1995.
R. J. Oglesby, A. J. Jakeman, D. A. Post, S. Schreider, Z. Fan, D. P. Hansen, J. A. Taylor, and J. W. Larson, "Coupling a regional precipitation runoff model to global and regional climate models," in *Proceedings of Global Analysis, Interpretation, and Modeling: the First Conference*, IGBP, Garmisch-Partenkirchen, Germany, 25-29 September, 1995.
J. W. Larson, J. A. Taylor, J. L. Kesteven, and M. F. Hutchinson, "Regional-scale climate studies of Australia using RegCM2," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 15-20 (1995).
J. W. Larson and R. J. Oglesby, "Various Approaches to the Problem of Model-Reality Comparison," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 274-283 (1995).
D. E. Hyman, D. R. Whitehouse, J. A. Taylor, J. W. Larson and J. A. Lindesay "The ANU Translator: Facilitating computer visualization and data analysis of climate model outputs," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 221-226 (1995).

Hansen, D., J. W. Larson and J. A. Taylor "The NCAR CCM2 (Community Climate Model 2) on the ANU Fujitsu VP2200," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 269-274 (1995).
S. Marshall, J. A. Taylor, S. D. Prager, R. J. Oglesby, J. W. Larson, and D. J. Erickson III, "Climatic effects of biomass burning," in *Proceedings of the International Congress on Modeling and Simulation*, Newcastle, 27-30 November, Vol. II, 56-60 (1995).
J. W. Larson, P. M. Lyster, W. Sawyer, C. H. Q. Ding, J. Guo, A. M. da Silva, L. L. Takacs, "Progress in the Design and Optimization of the Parallel Goddard Data Assimilation System (DAS)," in *Proceedings of High Performance Computing 1997: Grand Challenges in Computer Simulation*, Ed. A. Tentner, p. 52., Society for Computer Simulation International (1997).
W. Sawyer, R. Lucchesi, P. M. Lyster, L. L. Takacs, A. Molod, J. Larson, S. Nebuda, C. Pabon-Ortiz, "Parallelization Aspects of an Atmospheric General Circulation Model for Data Assimilation," in *Proceedings of the 1998 Advanced Simulation Technologies Conference, High Performance Computing Symposium*, Ed. A. Tentner, Society for Computer Simulation International, ISBN 1 56555 145 1 (1998).

2.i. Grants and Contracts:
NSF NATO Summer School Travel Grant, 1992 $1,000.

Fujitsu Corporation Ltd Japan (With Dr.John Taylor CRES/ANU) 10/95 Parallel Computing in Regional Climate Modelling $23,000

United States Department of Energy (With Dr. Ian Foster, and others), $240,000 FY 2000, and $480,000 FY 2001.

2.k. Recent Reviewing Activities:
In 1997, I reviewed a paper for the *Parallel Computing Special Issue on Applications: Regional Weather Models.*
In 1996, I reviewed a paper for the journal *Environmental Modelling and Assessment.*

3.a.i. Teaching:
Undergraduate Teaching:
Four semesters teaching Introductory Astronomy Laboratory courses.
Two semesters teaching Introductory Physics Laboratory courses.
Four semesters grading homework for Freshman Physics courses.
One semester grading homework for an Undergraduate Thermodynamics course.
One semester grading homework for an Undergraduate Electricity and Magnetism course.

High-school Teaching:
The summer of 1990 I was an Astronomy Laboratory instructor for the Virginia Governor's School.

Other Teaching:
During the Spring and Summer of 1992 I taught Kaplan Test Preparation courses for the Physics/Chemistry Section of the MCAT exam, and the Mathematics section of the GRE General Exam.